J. R. GEORGE.

SHEARING MACHINE.

APPLICATION FILED APR. 29, 1909.

1,049,846. Patented Jan. 7, 1913.

Fig. 1.

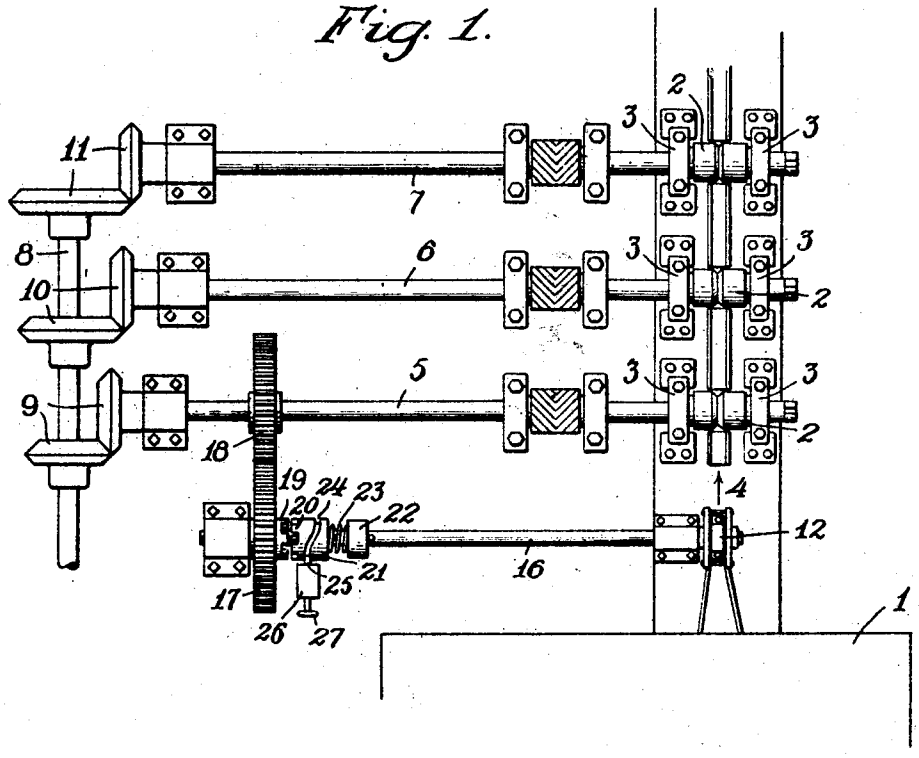


Fig. 2.

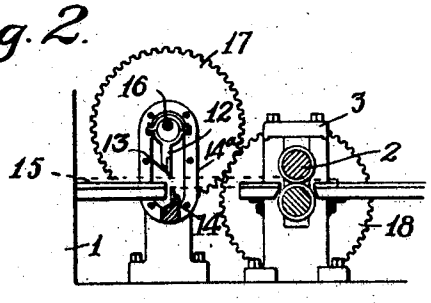
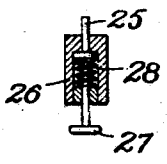


Fig. 3.



Witnesses

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SHEARING-MACHINE.

1,049,846. Specification of Letters Patent. Patented Jan. 7, 1913.

Application filed April 29, 1909. Serial No. 492,866.

To all whom it may concern:

Be it known that I, JEROME R. GEORGE, a citizen of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in Shearing-Machines, of which the following is a specification, accompanied by drawings forming a part of the same, in which—

Figure 1 represents in plan view a portion of a rolling mill embodying my present invention. Fig. 2 is an end view of the shear and the first pair of rolls in the mill. Fig. 3 is a detached view in section of the spring actuated pin 25.

Similar reference figures refer to similar parts in the different views.

My present invention relates to the combination with the rolls of a rolling mill, of a shearing apparatus, designed to sever a bar of metal during its movement through the rolls of the mill, and it has for its object to maintain a fixed relation of speed between the cutting blades of the shear and the peripheries of the rolls. This object is accomplished by the construction and arrangement of parts as hereinafter described, the novel features being pointed out in the annexed claims.

Referring to the accompanying drawings 1 denotes a furnace from which heated ingots or bars are fed to the pairs of rolls 2 of a rolling mill, supported in housings 3 and arranged for the consecutive reduction of a rod passing between them, in the direction of the arrow 4. Each pair of rolls are driven from roll shafts 5, 6 and 7, driven from a common driving shaft 8 by means of bevel gear connections 9, 10 and 11 arranged to give an increased peripheral speed to each successive pair of rolls, in order to provide for the elongation of the metal as it passes between them.

Located in any desired position with relation to the rolls of the mill, in the present instance between the first pair of rolls and the furnace, I place a shear 12 of any known type adapted to sever the heated ingot or bar during the period of its longitudinal movement between the rolls of the mill. The heated ingot or bar is withdrawn from the furnace and passed between the cutting blades 13 and 14 of the shear, which are normally in a stationary position, and separated sufficiently to allow the passage of the heated ingot or bar, represented by the broken lines 15, Fig. 2.

In order to cut the ingot or bar, the cutting blades 13 and 14 are caused to approach, and in order to allow this cutting to be done without interrupting the movement of the bar, the framework 14^a of the shear is arranged capable of a slight swinging movement upon the shaft 16 as an axis to allow the shear to follow the ingot until the cutting is accomplished.

The advancing end of the ingot or bar is entered between the first pair of rolls and during the longitudinal movement of the ingot as it passes between the rolls, it is sometimes desirable to sever the heated ingot or bar, as for example, to cut off the final or crop end when the same is imperfect, or to sever the ingot or bar when its movement between the rolls is interrupted, in order to prevent the formation of what is known as a "cobble". Whenever the necessity for severing the bar arises, the shear is put into operation by the attendant and the severing of the ingot or bar is accomplished as above described without interfering with its longitudinal movement through the rolls, and without requiring any cessation or slackening of the speed of the rolls.

The above result of cutting the ingot is accomplished by means of my present invention by so connecting the driving mechanism of the pair of rolls in front of the shear and the driving mechanism of the shear, that a predetermined correspondence of movement is maintained, with a fixed relative speed between the blades of the shear in their cutting action and the peripheral speed of that pair of rolls by which the ingot or bar is being moved between the blades of the shear.

In the present embodiment of my invention I operate the movable blades of the shear by means of a rotatable shaft 16 carrying a spur gear 17 turning loosely on the shaft 16 and in mesh with a spur gear 18 attached to the roll shaft 5 of the pair of rolls next the shear. The loose gear 17 is provided with a clutching member 19 adapted to be engaged by a slidable clutching member 20, formed on a collar 21 having a spline connection with the shaft 16, and capable of a sliding movement thereon. Attached to the shaft 16 is a collar 22 and interposed between the fixed collar 22 and the

sliding collar 21 is a spiral spring 23, with its tension exerted to hold the clutch members 19 and 20 in engagement. The sliding collar 21 is provided with a curved cam groove 24 adapted to receive the end of a pin 25, which is capable of sliding in a fixed framework 26.

The outer end of the sliding pin 25 is provided with a handle 27 by which the pin may be withdrawn from the cam slot 24, and inclosed within a chamber of the framework 26 is a spiral spring 28 acting to move the sliding pin 25 into the cam groove 24. The function of the sliding pin 25 when its end is inserted in the cam groove 24 is to hold the clutching member 20 out of engagement with the clutching member 19, thereby disconnecting the gear 17 and shaft 16 and allowing the latter to remain at rest. Whenever it is desired to set the shear in operation, the attendant withdraws the pin 25 from the cam groove 24, allowing the spiral spring 23 to immediately carry the clutch 20 into engagement with the clutch 19, and cause the rotation of the gear 17 to be imparted to the shaft 16. The immediate release of the sliding pin 25 will cause it to rest upon the periphery of the collar 21 until a section of the cam groove passes beneath the pin. When this occurs the pin is forced by the spring 28 into the cam groove and the rotation of the cam groove past the end of the pin slides the collar on the shaft 16 and disengages the clutch 20 from the clutch 19, allowing the shaft 16 to remain at rest. During the operation of the shear the cutting speed of the movable shear blade will bear a fixed relation to the peripheral speed of the rolls by means of the operative connection of both the shear and the rolls with a common driving shaft or source of power.

I claim,

1. The combination of a pair of rolls and a shear, said rolls and said shear having a common operative connection whereby their speeds shall bear a fixed relation means for setting said shear in operation at will, said means arranged automatically to disconnect said shear from said source of power after one cutting operation.

2. The combination of a pair of rolls and a shear, a shaft arranged to drive said rolls and a second shaft for operating said shear, means for connecting said shafts, whereby the operating speed of said shear will bear a fixed relation to the speed of said rolls, and a clutching mechanism arranged to connect said shafts at will and automatically to disconnect them after a single cutting operation of said shear.

3. In a rolling mill, a pair of rolls, a shaft connecting said pair of rolls with the driving power, a shear, a rotatable shaft operatively connected with said shear, a connection between said roll and said shear, operating shafts comprising a pair of intermeshed gears, and a clutching mechanism whereby said shafts may be operatively connected at will, said clutching mechanism arranged to disconnect said shafts automatically after a single cutting operation of said shear.

Dated this twenty-seventh day of April, 1909.

JEROME R. GEORGE.

Witnesses:
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